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1. SPECIFICATIONS

1.1 Features

| <u>Item</u> | <u>Standard Value</u> |
|-----------------------------|---|
| Display Resolution | 800 * 3 (RGB) * 480 Dots |
| LCD Type | Full Viewing Angle, Normally Black , Transmissive type |
| Screen size(inch) | 7.0 inch |
| Color configuration | RGB Vertical Strip |
| Backlight Type | White LED B/L |
| Weight | 106g |
| Interface | RGB |
| Other(controller/driver IC) | ST72568 (Or Compatible IC) |
| ROHS | THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news_detail.php?Key=1&cID=1 |

1.2 Mechanical Specifications

| <u>Item</u> | <u>Standard Value</u> | <u>Unit</u> |
|-------------------|------------------------------|-------------|
| Outline Dimension | 164.9(W) x 100.0(L) x 3.4(H) | mm |

LCD panel

| <u>Item</u> | <u>Standard Value</u> | <u>Unit</u> |
|-------------|------------------------|-------------|
| Active Area | 153.84 (W) x 85.632(L) | mm |
| Pixel Size | 0.1923(W) * 0.1784(H) | mm |

Note: For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

| <u>Item</u> | <u>Symbol</u> | <u>Condition</u> | <u>Min.</u> | <u>Max.</u> | <u>Unit</u> | <u>Remark</u> |
|----------------------------|----------------------|------------------|-------------|-------------|-------------|---------------|
| Power Supply for TFT Panel | DVDD | GND=0 | -0.3 | 4.0 | V | |
| Operating Temperature | T _{OP} (Ts) | Note 1 | -20 | +70 | °C | - |
| Storage Temperature | T _{ST} (Ta) | Note 2 | -30 | +80 | °C | |

The absolute maximum rating values of this product are not allowed to be exceeded at any time. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 1: Ts is the temperature of panel's surface

Note 2: Ta is the ambient temperature of samples

1.4 DC Electrical Characteristics

Module

GND = 0V, Ta = 25°C

| <u>Item</u> | <u>Symbol</u> | <u>Condition</u> | <u>Min.</u> | <u>Typ.</u> | <u>Max.</u> | <u>Unit</u> |
|------------------------------|-----------------|------------------|-------------|-------------|-------------|-------------|
| Power Supply for TFT Panel | DVDD | GND=0V | 3.1 | 3.3 | 3.6 | V |
| Input Voltage for TFT Panel | V _{IH} | GND=0V | 0.7DVDD | - | DVDD | V |
| | V _{IL} | GND=0V | 0 | - | 0.3DVDD | |
| Supply Current for TFT Panel | DIDD | DIDD@DVDD=3.3V | - | 100 | 150 | mA |

1.5 Optical Characteristics

TFT LCD Module

DVDD= 3.3 V, Ta=25°C

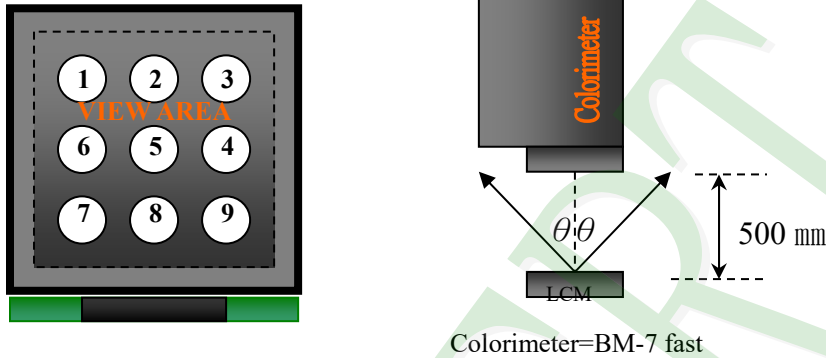
| Item | Symbol | | Condition | Min. | Typ. | Max. | unit | - |
|---|--------|-----|--------------------------|------|------|------|-------|--------|
| Response time | Tr+Tf | | Ta = 25°C θX, θY = 0° | - | 30 | 45 | ms | Note 2 |
| Viewing angle | Top | θY+ | CR ≥ 10 | | 80 | - | Deg. | Note 4 |
| | Bottom | θY- | | | 80 | - | | |
| | Left | θX- | | | 80 | - | | |
| | Right | θX+ | | | 80 | - | | |
| Contrast ratio | CR | | | 500 | 600 | - | - | Note 3 |
| Color of CIE Coordinate (With B/L) | White | X | Ta = 25°C θX, θY = 0° | 0.23 | 0.28 | 0.33 | - | Note1 |
| | | Y | | 0.31 | 0.36 | 0.41 | | |
| | Red | X | | 0.53 | 0.58 | 0.63 | | |
| | | Y | | 0.32 | 0.37 | 0.42 | | |
| | Green | X | | 0.27 | 0.32 | 0.37 | | |
| | | Y | | 0.56 | 0.61 | 0.66 | | |
| | Blue | X | | 0.08 | 0.13 | 0.18 | | |
| | | Y | | 0.08 | 0.13 | 0.18 | | |
| Average Brightness Pattern=white display (With B/L) *2 | IV | | IF=160mA | 310 | 500 | - | cd/m2 | Note1 |
| Uniformity (With B/L) *1 | Δ B | | IF=160mA | 70 | - | - | % | Note1 |

Note 1:

*1: $\Delta B = B(\min) / B(\max) * 100\%$

*2: Measurement Condition for Optical Characteristics:

- a: Environment: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ / $60 \pm 20\%$ R.H, no wind, dark room below 10 Lux at typical lamp current and typical operating frequency
- b: Measurement Distance: 500 ± 50 mm, ($\theta = 0^{\circ}$)
- c: Equipment: TOPCON BM-7 fast, (field 1°), after 10 minutes operation
- d: The uncertainty of the C.I.E coordinate measurement ± 0.01 , Average Brightness $\pm 4\%$



To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note 2: Definition of response time:

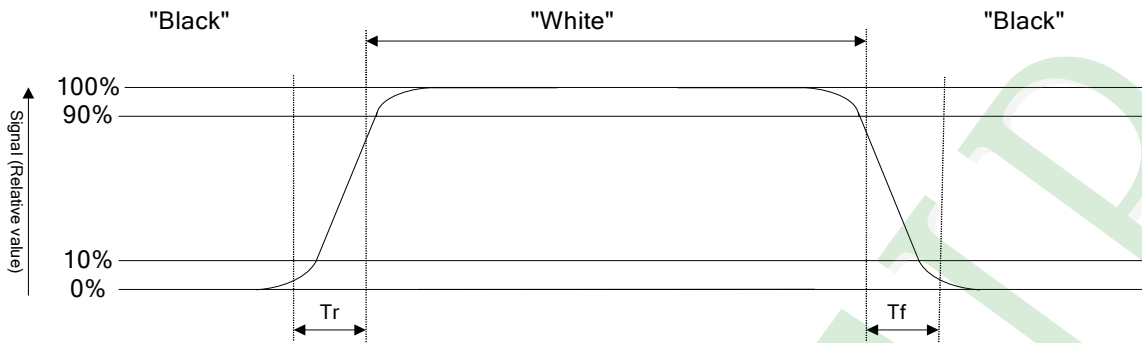
The output signals of photo detector are measured when the input signals are changed from "black" to "white" (falling time) and from "white" to "black" (rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



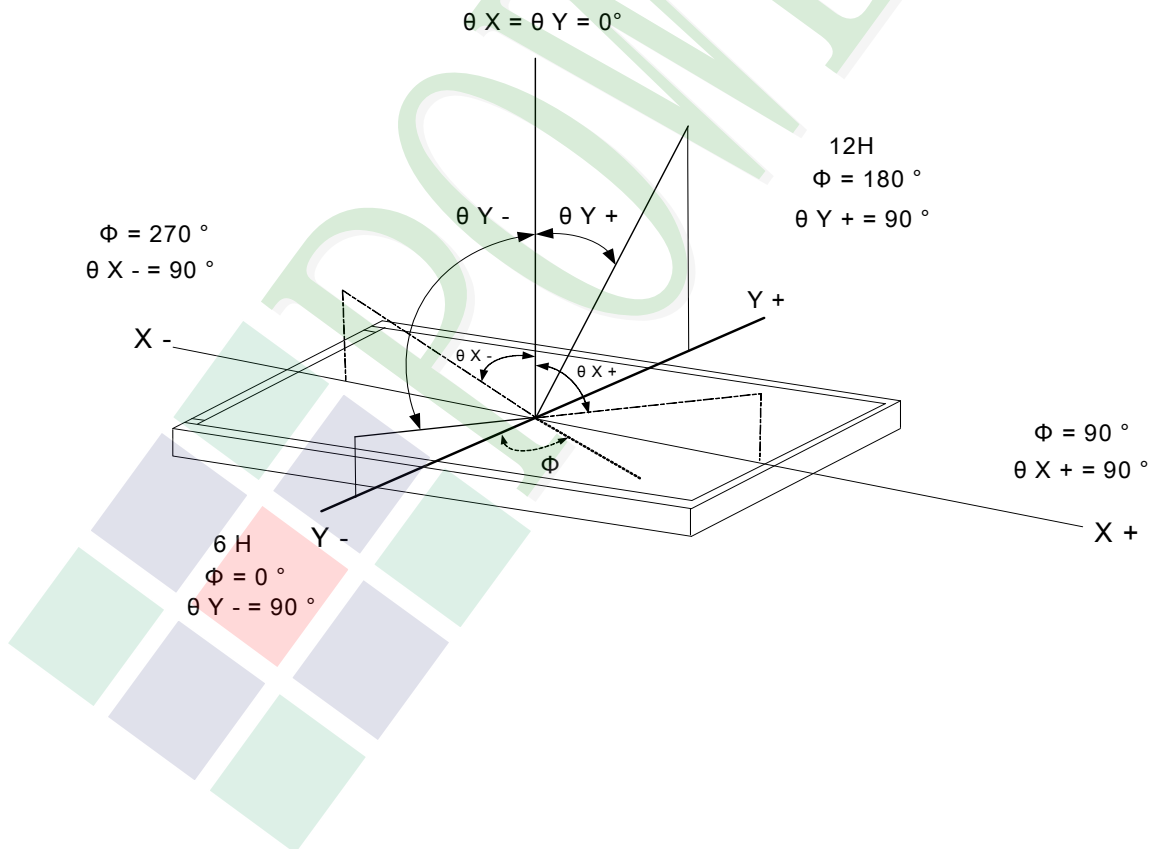
Note 3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

Note 4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Characteristics

Maximum Ratings

| Item | Symbol | Min. | Max. | Unit | Remark |
|---------------------|--------|------|------|------|----------|
| LED Forward Current | I_F | - | 30 | mA | Each LED |
| LED Reverse Voltage | V_R | - | 5.0 | V | |
| Power Dissipation | PD | | 99 | mW | |

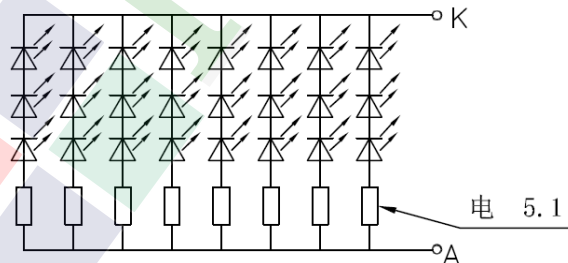
Electrical / Optical Characteristics

| Item | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------------|--------|------------------------|------|------|------|-----------------|
| Forward Voltage | V_F | | 8.4 | 9.0 | 10.2 | V |
| Average Brightness (Without LCD) | I_V | $I_F = 160 \text{ mA}$ | 6300 | 7560 | - | cd/m^2 |
| CIE Color Coordinate (Without LCD) | X | | 0.25 | - | 0.31 | - |
| | Y | | 0.26 | - | 0.32 | |
| Color | White | | | | | |

Note 1: The LED Supply Voltage is defined by the number of LED at $T_a = 25^\circ\text{C}$ and $I_L = 160\text{mA}$.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a = 25^\circ\text{C}$ and $I_L = 160 \text{ mA}$. The LED life time could be decreased if operating I_L is larger than 160mA.

B/L Internal Circuit Diagram



Other Description

| Item | Conditions | Description |
|-----------|--|-------------|
| Life Time | $T_a = 25^\circ\text{C}$ $I_F = 160 \text{ mA}$ | 20,000 hrs |

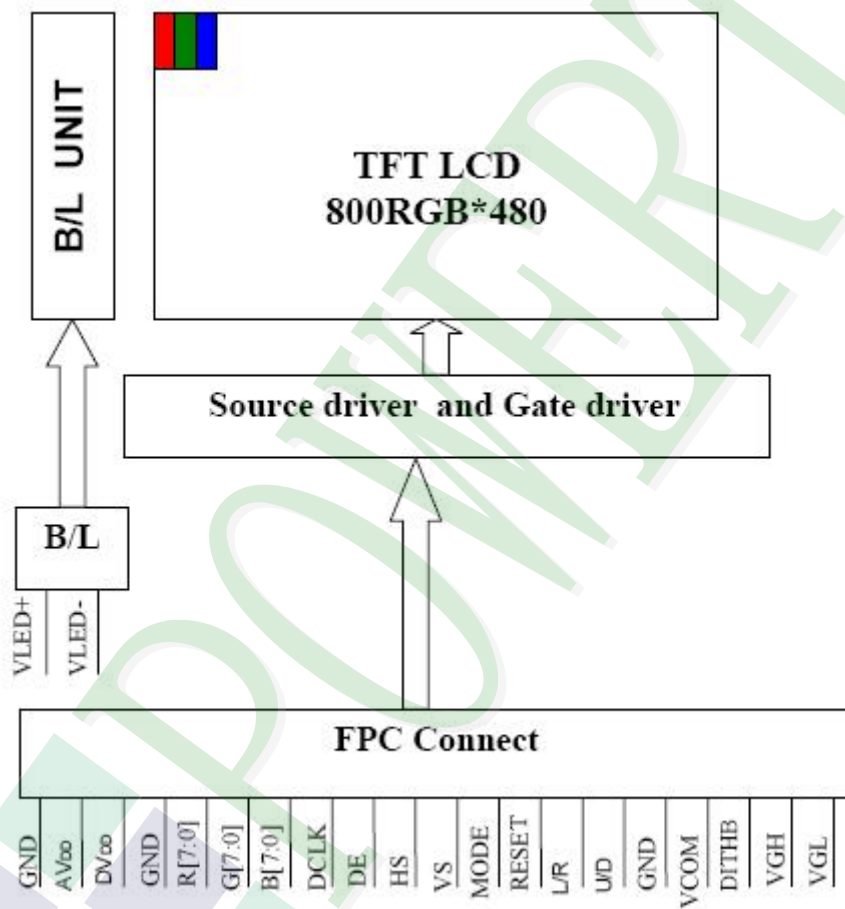
2. Module Structure

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

TFT LCM Interface

| Pin# | Name | Description |
|------|-------|---|
| 1 | VLED+ | Power For LED backlight (+). |
| 2 | VLED+ | Power For LED backlight (+). |
| 3 | VLED- | Power For LED backlight (-). |
| 4 | VLED- | Power For LED backlight (-). |
| 5 | GND | Power ground. |
| 6 | VCOM | No Function,Not Connection |
| 7 | DVDD | Power for Digital Circuit. |
| 8 | MODE | No Function,Not Connection |
| 9 | DE | Input data enable control. When DE mode, active High to enable data |
| 10 | VS | Vertical sync signal. Negative polarity |
| 11 | HS | Horizontal sync signal. Negative polarity |
| 12 | B7 | Blue Data (MSB). |
| 13 | B6 | Blue Data. |
| 14 | B5 | Blue Data. |
| 15 | B4 | Blue Data. |
| 16 | B3 | Blue Data. |
| 17 | B2 | Blue Data. |
| 18 | B1 | Blue Data. |
| 19 | B0 | Blue Data (LSB). |
| 20 | G7 | Green Data (MSB). |
| 21 | G6 | Green Data. |
| 22 | G5 | Green Data. |
| 23 | G4 | Green Data. |
| 24 | G3 | Green Data. |
| 25 | G2 | Green Data. |
| 26 | G1 | Green Data. |
| 27 | G0 | Green Data (LSB). |
| 28 | R7 | Red Data (MSB). |
| 29 | R6 | Red Data. |



| <u>Pin#</u> | <u>Name</u> | <u>Description</u> |
|-------------|-------------|--|
| 30 | R5 | Red Data. |
| 31 | R4 | Red Data. |
| 32 | R3 | Red Data. |
| 33 | R2 | Red Data. |
| 34 | R1 | Red Data. |
| 35 | R0 | Red Data (LSB). |
| 36 | GND | Power Ground |
| 37 | DCLK | Sample clock. Latch data at DCLK falling edge. |
| 38 | GND | Power Ground. |
| 39 | L/R | Horizontal scan direction control. |
| 40 | U/D | Vertical scan direction control |
| 41 | VGH | No Function,Not Connection |
| 42 | VGL | No Function,Not Connection |
| 43 | AVDD | No Function,Not Connection |
| 44 | RESET | Global reset pin. Low active. |
| 45 | NC | No connection. |
| 46 | VCOM | No Function,Not Connection |
| 47 | DITHB | No Function,Not Connection |
| 48 | GND | Power Ground. |
| 49 | NC | No connection. |
| 50 | NC | No connection. |

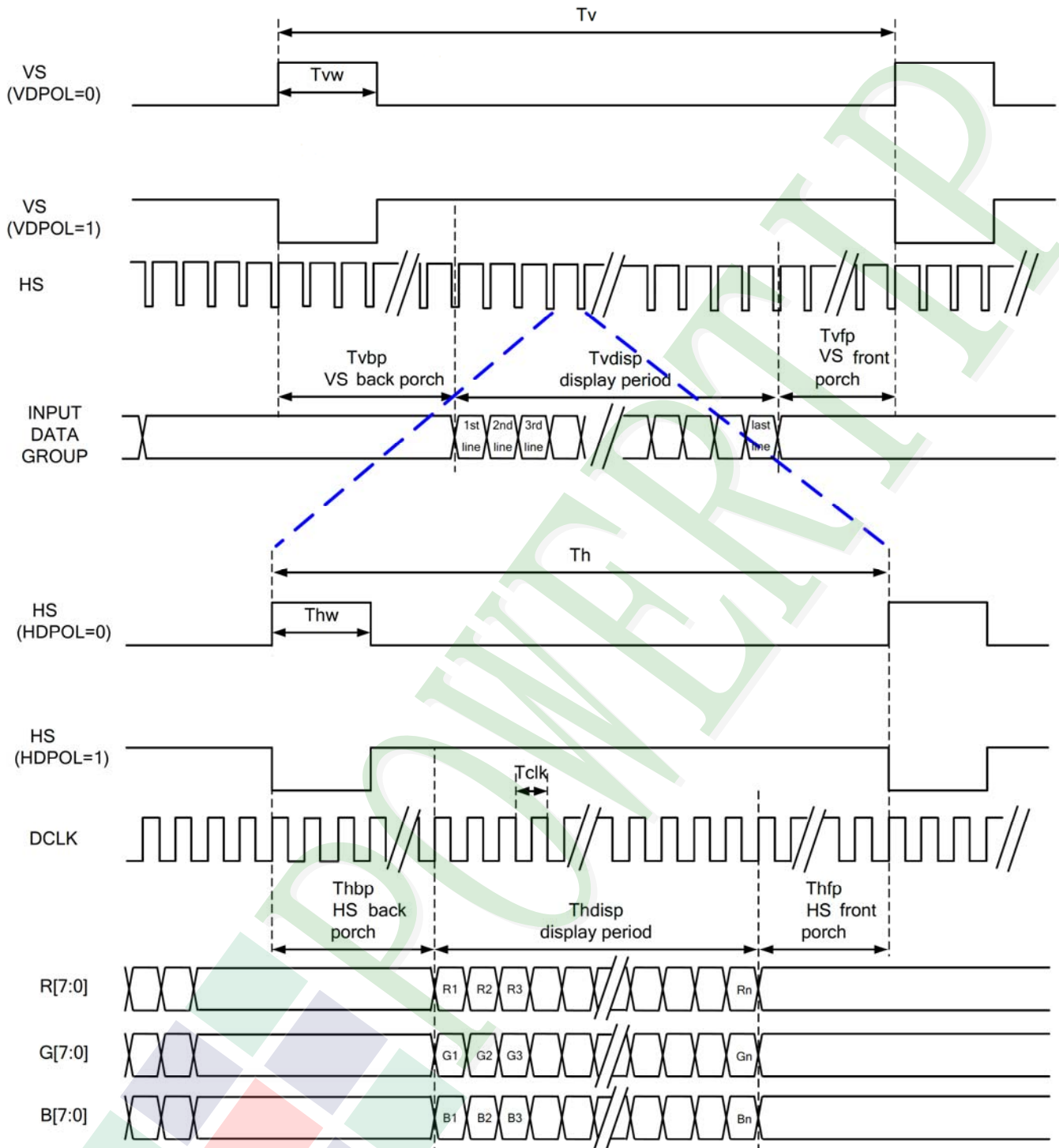
2.3 Timing Characteristics

2.3.1 RGB Mode Selection Table

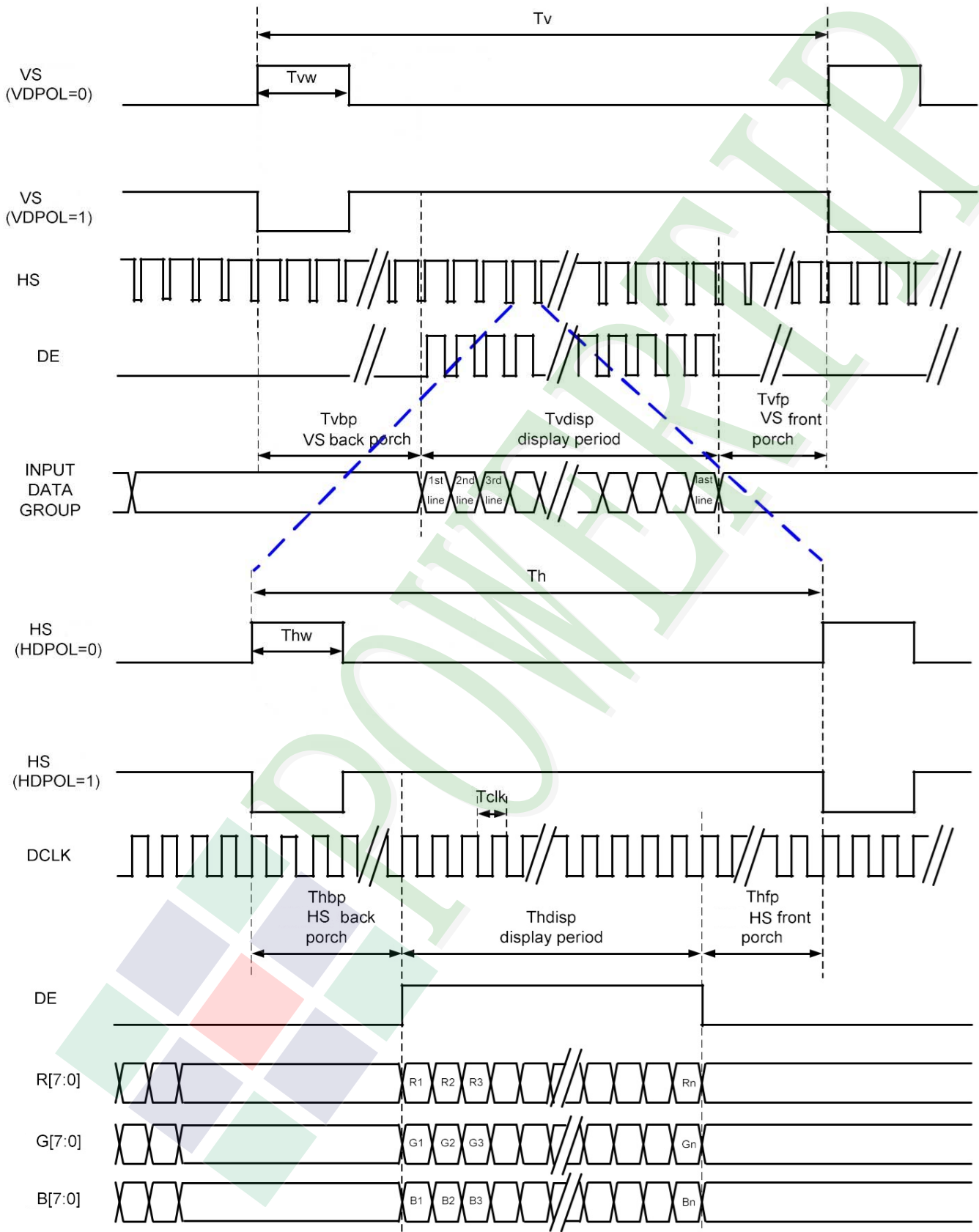
| <u>RGB Mode Selection Table</u> | <u>DCLK</u> | <u>HSYNC</u> | <u>VSYNC</u> | <u>DE</u> |
|---------------------------------|-------------|--------------|--------------|-----------|
| SYNC - DE Mode | Input | Input | Input | Input |
| SYNC Mode | Input | Input | Input | GND |
| DE Mode | Input | GND | GND | Input |

Note: "Input" means these signals are driven by host side

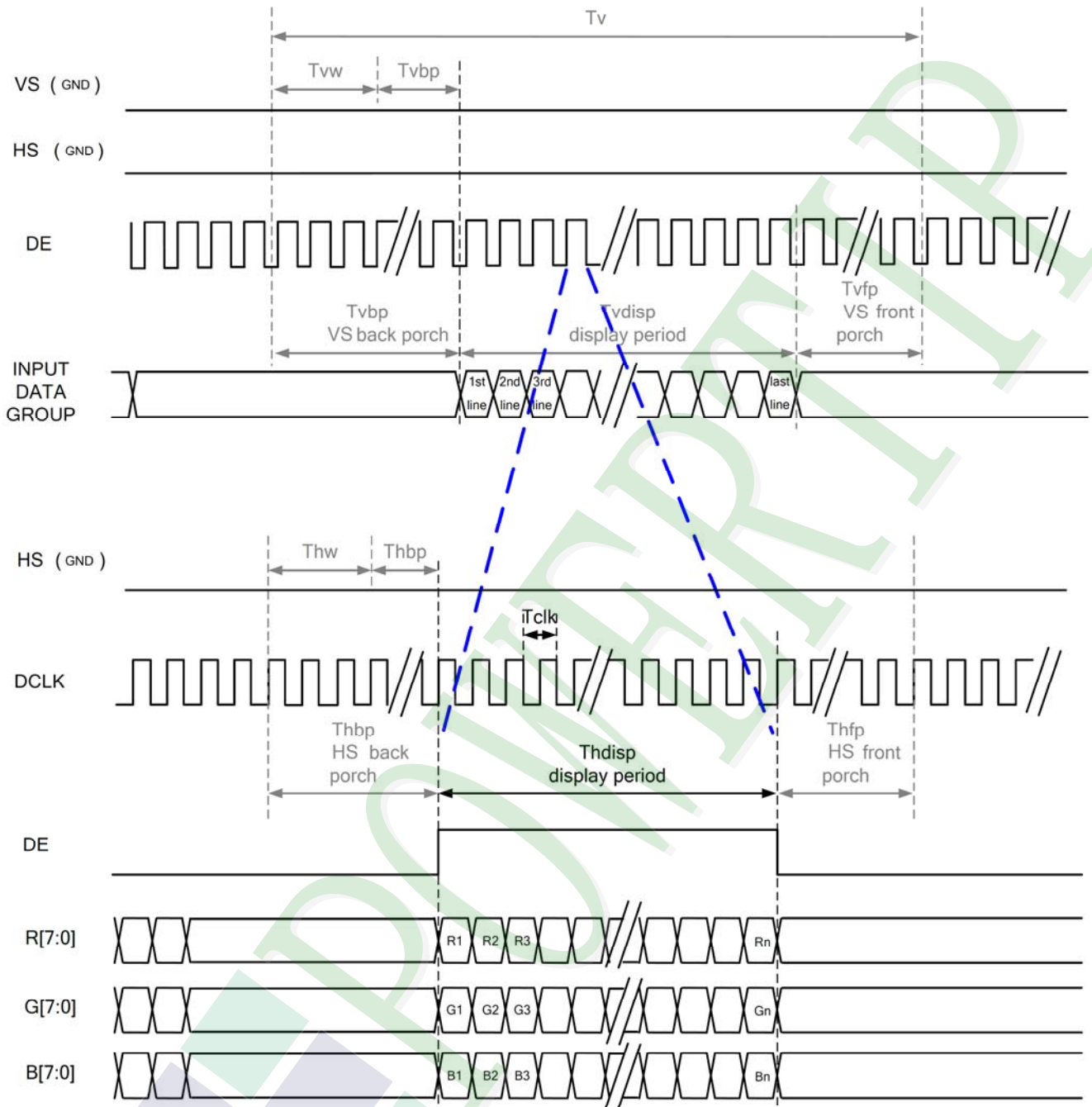
2.3.2 SYNC Mode



2.3.3 SYNC-DE Mode



2.3.4 DE Mode

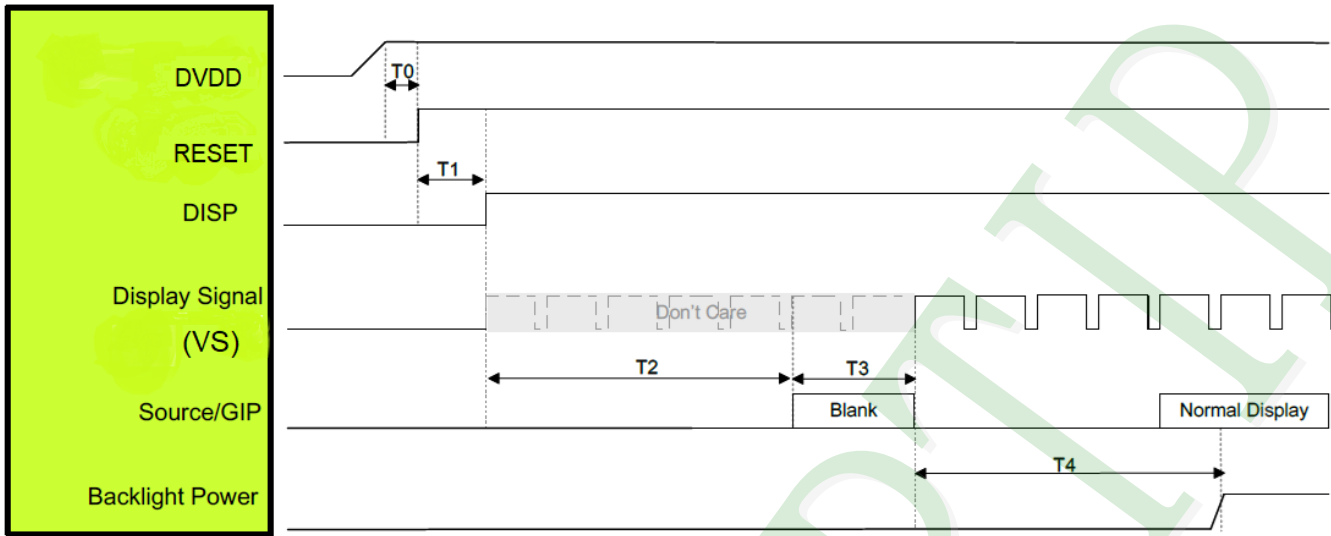


2.3.5 Parallel 24-bit RGB Input Timing Table

| Parallel 24-bit RGB Interface Timing Table | | | | | | | |
|--|----------------|--------|------|------|------|--------|--|
| Item | Symbol | Min. | Typ. | Max. | Unit | Remark | |
| DCLK Frequency | Fclk | 23 | 25 | 27 | MHz | | |
| HS | Period Time | Th | 808 | 816 | 896 | DCLK | |
| | Display Period | Thdisp | 800 | | | DCLK | |
| | Back Porch | Thbp | 4 | 8 | 24 | DCLK | |
| | Front Porch | Thfp | 4 | 8 | 24 | DCLK | |
| | Pulse Width | Thw | 2 | 4 | 8 | DCLK | |
| VS | Period Time | Tv | 496 | 512 | 528 | HSYNC | |
| | Display Period | Tvdisp | 480 | | | HSYNC | |
| | Back Porch | Tvbp | 8 | 16 | 24 | HSYNC | |
| | Front Porch | Tvfp | 8 | 16 | 24 | HSYNC | |
| | Pulse Width | Tvw | 2 | 4 | 8 | HSYNC | |

2.3.6 Power On Sequence

1 Power Mode



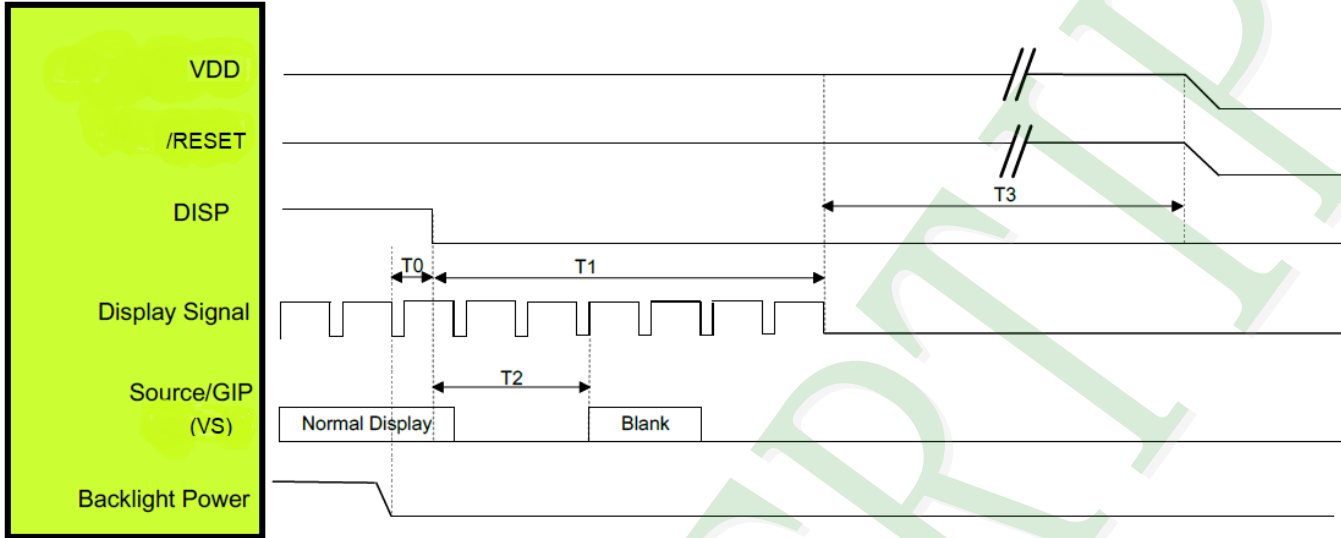
| Symbol | Description | Min. Time | Unit |
|--------|---|------------|------|
| T0 | System power stability to /RESET signal | ≥ 1 | ms |
| T1 | /RESET= "High" to DISP="High" | ≥ 10 | ms |
| T2 | DISP="High" to Source/GIP scan blank | 85 | ms |
| T3 | IC scan blanking signal | ≥ 33 | ms |
| T4 | Display Signal output to Backlight Power on | ≥ 100 | ms |

Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

2. RGB interface Display signal: DCLK; VS; HS; DE; R[7:0]; G[7:0]; B[7:0].

2.3.7 Power Off Sequence

1 Power Mode



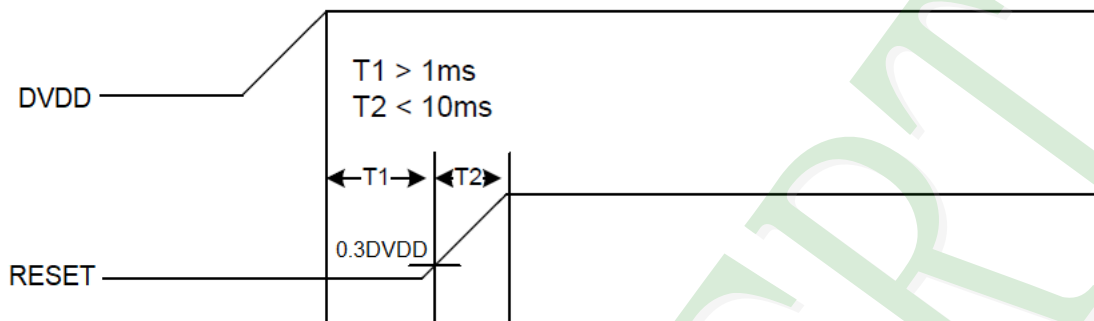
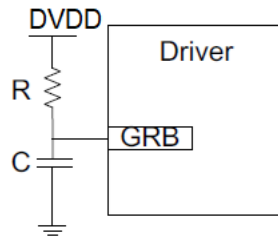
| Symbol | Description | Min. Time | Unit |
|--------|---|------------|------|
| T0 | Backlight Power off to DISP="Low" | ≥ 1 | ms |
| T1 | DISP="Low" to IC internal voltage discharge complete | ≥ 100 | ms |
| T2 | DISP="Low" to Source/GIP scan blank (base on Display Signal Frame Rate 60Hz) | ≤ 50 | ms |
| T3 | IC internal voltage discharge is completed to VDD off | ≥ 0 | ms |

Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

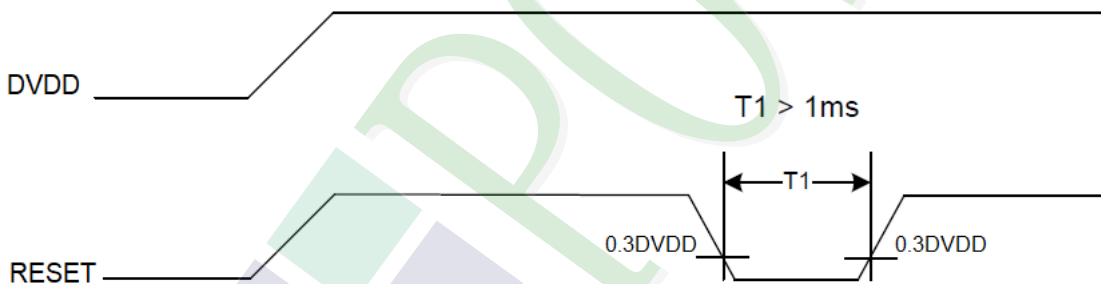
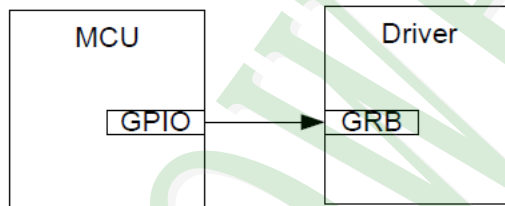
2. RGB interface Display signal: DCLK; VS; HS; DE; R[7:0]; G[7:0]; B[7:0].

2.5 Reset timing

1. The /RESET pin with external RC circuit.

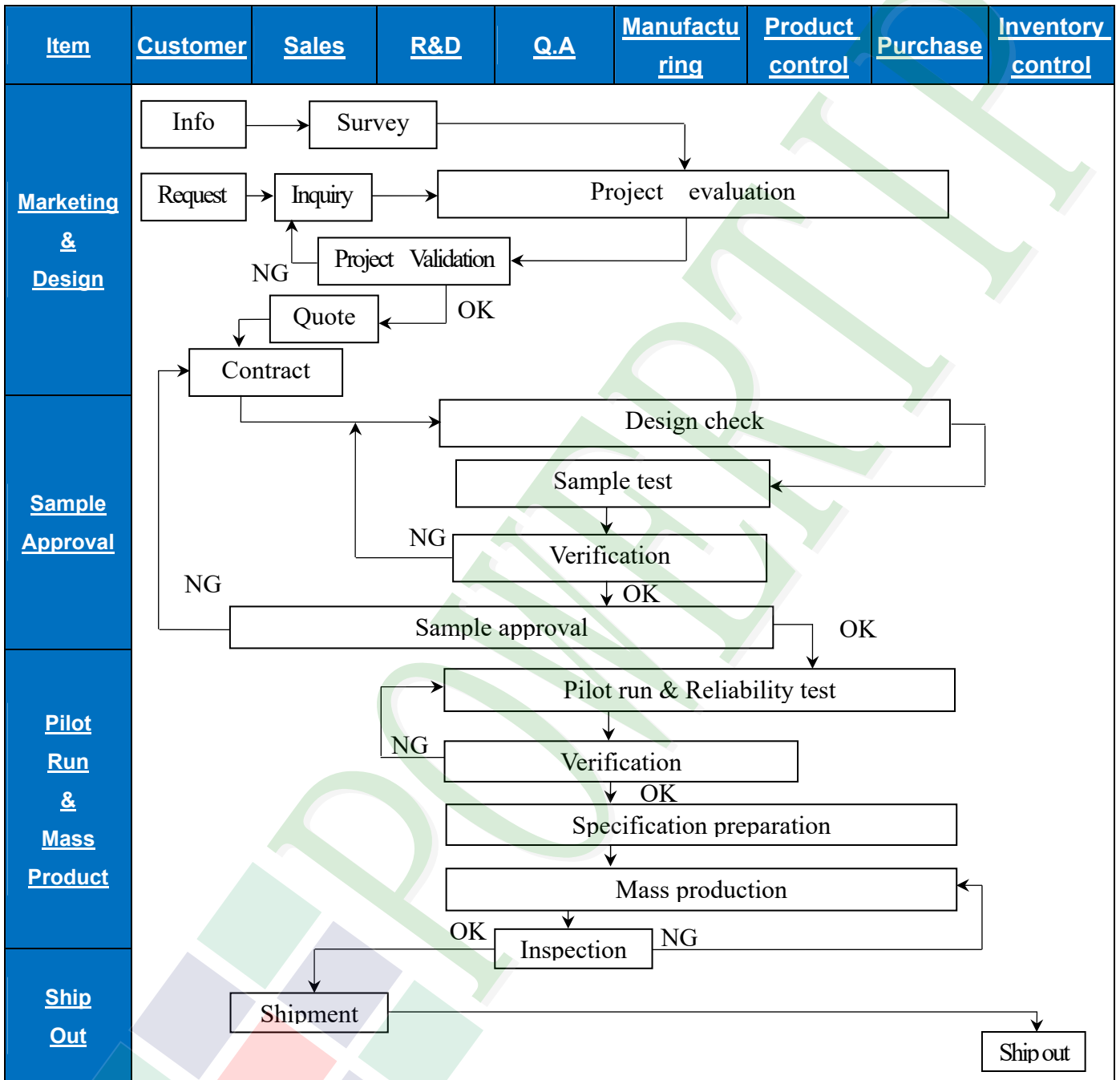


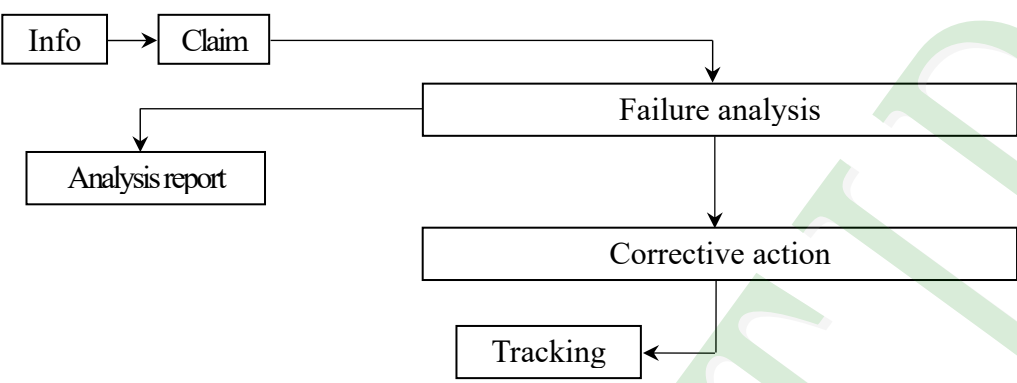
(2) The GRB pin controlled by MCU.



3. Quality Assurance System

3.1 Quality Assurance Flow Chart



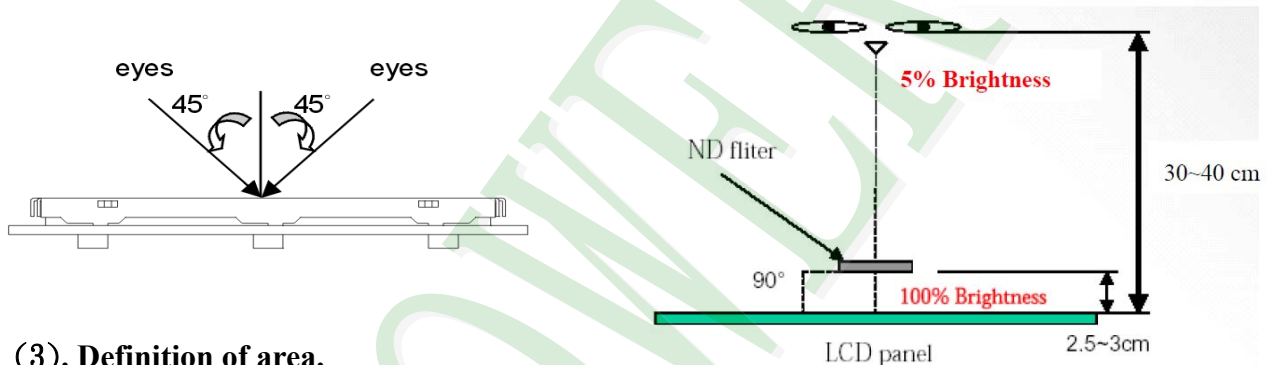
| Item | Customer | Sales | R&D | Q.A | Manufacturing | Product control | Purchase | Inventory control |
|----------------------|---|-------|-----|-----|---------------|-----------------|----------|-------------------|
| Sales Service |  <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Failure --> Report[Analysis report] Failure --> Action[Corrective action] Action --> Tracking[Tracking] </pre> | | | | | | | |
| Q.A Activity | <ol style="list-style-type: none"> 1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management | | | | | | | |

3.2 Inspection Specification

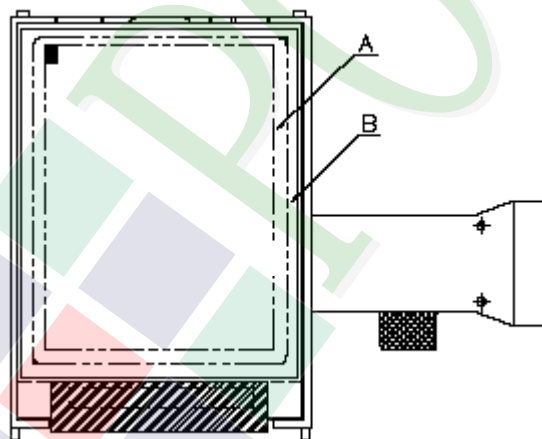
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0. 4; Minor Defect AQL: 1. 5
- ◆OUT Going Defect Level: Sampling
- ◆Standard of the product appearance test:

a. Manner of appearance test:

- (1). The test best be under 20W×2 fluorescent light(about 300lux ~500lux) and distance of view must be at 30~40 cm.
- (2). The test direction is base on about around 45° of vertical line.



(3). Definition of area.



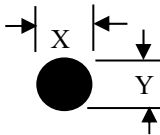
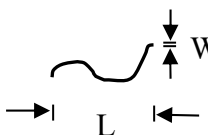
A area: viewing area

B area: Outside of viewing area

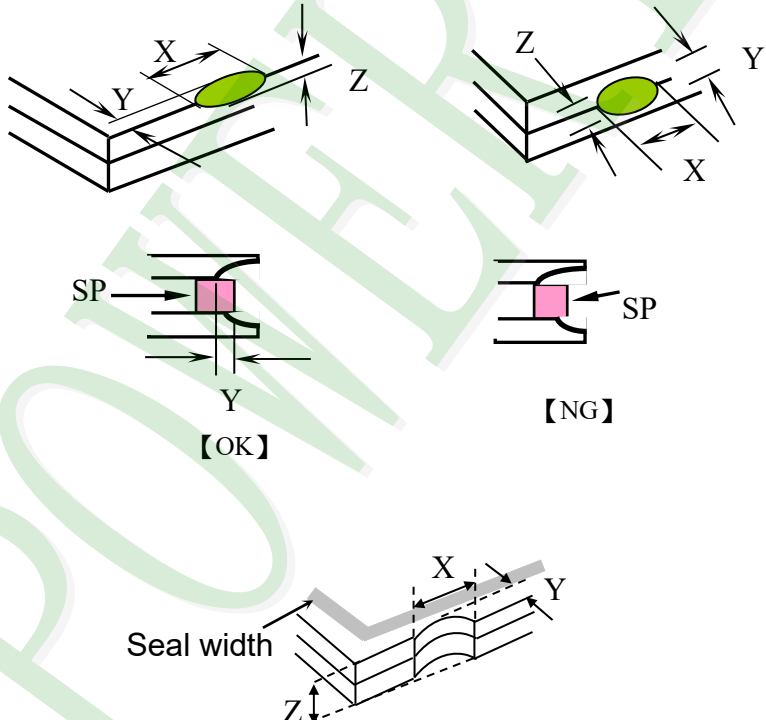
(4). Standard of inspection : (Unit : mm)

| <u>NO</u> | <u>Item</u> | <u>Criterion</u> | <u>Level</u> | | | | | | | | | | |
|--|---|---|--------------------------|--------------------------|------------|----------|----------|----------|-----------|----------|-------|----------|-------|
| 01 | Product condition | 1.1 The part number is inconsistent with work order of production. | Major | | | | | | | | | | |
| | | 1.2 Mixed product types. | Major | | | | | | | | | | |
| | | 1.3 Assembled in inverse direction. | Major | | | | | | | | | | |
| 02 | Quantity | 2.1 The quantity is inconsistent with work order of production. | Major | | | | | | | | | | |
| 03 | Outline dimension | 3.1 Product dimension and structure must conform to structure diagram. | Major | | | | | | | | | | |
| 04 | Electrical Testing | 4.1 Missing line character and icon. | Major | | | | | | | | | | |
| | | 4.2 No function or no display. | Major | | | | | | | | | | |
| | | 4.3 Display malfunction. | Major | | | | | | | | | | |
| | | 4.4 LCD viewing angle defect. | Major | | | | | | | | | | |
| | | 4.5 Current consumption exceeds product specifications. | Major | | | | | | | | | | |
| | | 4.6 Mura cannot be seen through 5% ND filter at 50% Gray, should be judged by the viewing angle of 90 degree. | Minor | | | | | | | | | | |
| 05 | Dot defect (Bright dot, Dark dot) On -display | <table border="1"> <thead> <tr> <th><u>Item</u></th> <th><u>Acceptance (Q'ty)</u></th> </tr> </thead> <tbody> <tr> <td>Bright Dot</td> <td>≤ 4</td> </tr> <tr> <td>Dark Dot</td> <td>≤ 5</td> </tr> <tr> <td>Joint Dot</td> <td>≤ 3</td> </tr> <tr> <td>Total</td> <td>≤ 7</td> </tr> </tbody> </table> | <u>Item</u> | <u>Acceptance (Q'ty)</u> | Bright Dot | ≤ 4 | Dark Dot | ≤ 5 | Joint Dot | ≤ 3 | Total | ≤ 7 | Minor |
| | | <u>Item</u> | <u>Acceptance (Q'ty)</u> | | | | | | | | | | |
| | | Bright Dot | ≤ 4 | | | | | | | | | | |
| | | Dark Dot | ≤ 5 | | | | | | | | | | |
| | | Joint Dot | ≤ 3 | | | | | | | | | | |
| Total | ≤ 7 | | | | | | | | | | | | |
| 5.1 Inspection pattern: full white, full black, Red, Green and blue screens. | | | | | | | | | | | | | |
| 5.2 It is defined as dot defect if defect area $> 1/2$ dot. | | | | | | | | | | | | | |
| 5.3 The distance between two dot defect ≥ 5 mm. | | | | | | | | | | | | | |
| 5.4 Bright dot : Dots appear bright and unchanged in visible with 5% ND filter is defined. | | | | | | | | | | | | | |
| 5.5 Tiny bright dot: bright dot area $\leq 1/2$ dot. | | | | | | | | | | | | | |
| | a. Dots appear bright and unchanged in visible with 5% ND filter is defined defect and is judged in accordance with 6.1 | | | | | | | | | | | | |
| | b. Dots invisible with 5% ND Filter is Ignored. | | | | | | | | | | | | |

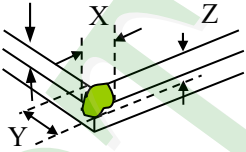
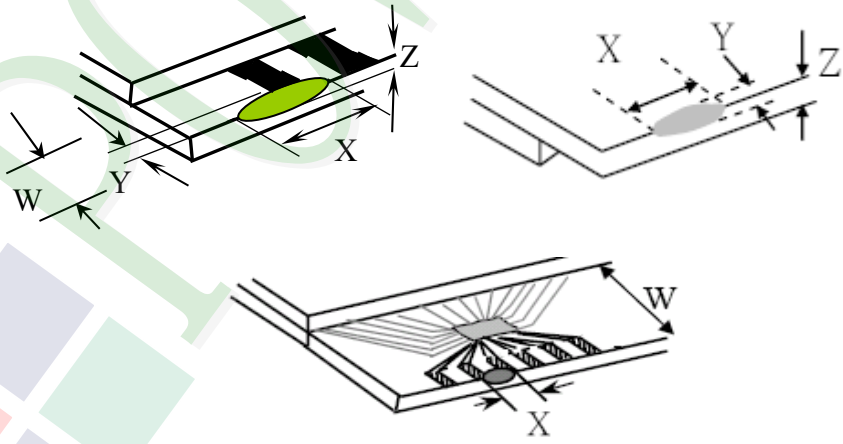
◆ Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

| NO | Item | Criterion | Level | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-------------------------------|-------------------|-----------|-------------------|--------|------------------|--------|---------------|-------------------------|--------|---------------|-------------------------|---|---------------|----------------------|-------|-----|------------|---------------|-------|--|--|---|--|-----------|-----|---------------|--------|--------|---------------|----------------------|---|-----|------------|---------------|-------|--|--|---|
| 06 | Black or white Dot, scratch, contamination Round type  $\Phi = (x+y) / 2$ Line type  | 6.1 Round type (Non-display or display): <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter: Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$\Phi > 0.50$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> </tr> </tbody> </table> | Dimension (diameter: Φ) | Acceptance (Q'ty) | | A area | B area | $\Phi \leq 0.25$ | Ignore | | $0.25 < \Phi \leq 0.50$ | 5 | Ignore | $\Phi > 0.50$ | 0 | Total | 5 | Minor | | | | | | | | | | | | | | | | | | | | | | | |
| | | Dimension (diameter: Φ) | | Acceptance (Q'ty) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A area | B area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi \leq 0.25$ | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.25 < \Phi \leq 0.50$ | 5 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi > 0.50$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.2 Line type(Non-display or display): <table border="1"> <thead> <tr> <th rowspan="2">module size</th> <th rowspan="2">Length (L)</th> <th rowspan="2">Width (W)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td rowspan="4">3.5" to less 9"</td> <td>---</td> <td>$W \leq 0.03$</td> <td>Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>4</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>2</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td>As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> <td></td> </tr> <tr> <td rowspan="4">9" to 15"</td> <td>---</td> <td>$W \leq 0.05$</td> <td>Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>5</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td>As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> </tr> </tbody> </table> | module size | Length (L) | Width (W) | Acceptance (Q'ty) | | A area | B area | 3.5" to less 9" | --- | $W \leq 0.03$ | Ignore | Ignore | $L \leq 10.0$ | $0.03 < W \leq 0.05$ | 4 | $L \leq 5.0$ | $0.05 < W \leq 0.10$ | 2 | --- | $W > 0.10$ | As round type | Total | | | 5 | | 9" to 15" | --- | $W \leq 0.05$ | Ignore | Ignore | $L \leq 10.0$ | $0.05 < W \leq 0.10$ | 5 | --- | $W > 0.10$ | As round type | Total | | | 5 |
| module size | | | | Length (L) | Width (W) | Acceptance (Q'ty) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A area | B area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.5" to less 9" | --- | $W \leq 0.03$ | Ignore | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 10.0$ | $0.03 < W \leq 0.05$ | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 5.0$ | $0.05 < W \leq 0.10$ | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | $W > 0.10$ | As round type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9" to 15" | --- | $W \leq 0.05$ | Ignore | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $L \leq 10.0$ | $0.05 < W \leq 0.10$ | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | --- | $W > 0.10$ | As round type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07 | Polarizer Bubble | <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter: Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>4</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$0.50 < \Phi \leq 0.80$</td> <td>1</td> </tr> <tr> <td>$\Phi > 0.80$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> </tr> </tbody> </table> | Dimension (diameter: Φ) | Acceptance (Q'ty) | | A area | B area | $\Phi \leq 0.25$ | Ignore | | $0.25 < \Phi \leq 0.50$ | 4 | Ignore | $0.50 < \Phi \leq 0.80$ | 1 | $\Phi > 0.80$ | 0 | Total | 5 | Minor | | | | | | | | | | | | | | | | | | | | | |
| Dimension (diameter: Φ) | Acceptance (Q'ty) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A area | B area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi \leq 0.25$ | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.25 < \Phi \leq 0.50$ | 4 | Ignore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $0.50 < \Phi \leq 0.80$ | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\Phi > 0.80$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

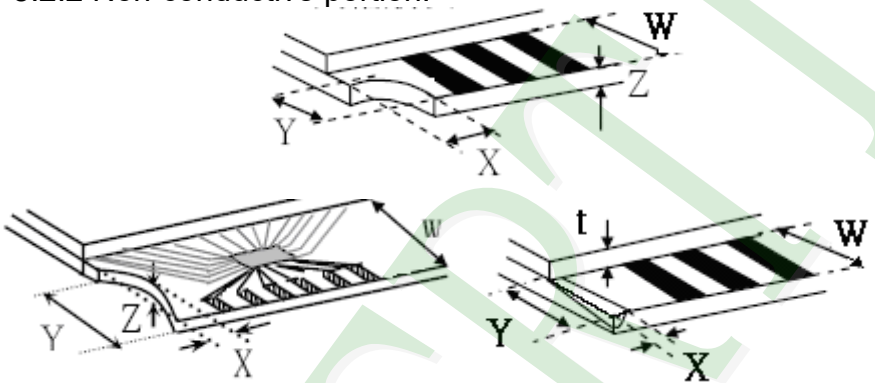
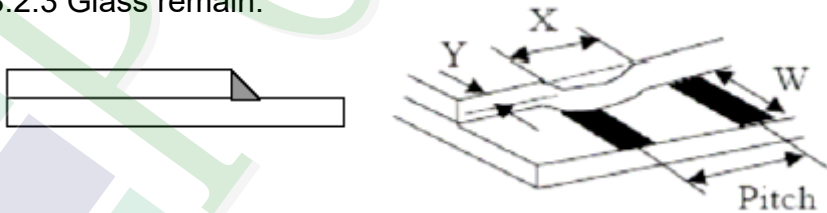

◆Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

| NO | Item | Criterion | Level | | | | | | | | | |
|----------|--|---|-------|---|---|----------|--------------------------------|--------------|----------|--|----------------------|-------|
| 08 | The crack of glass | <p>Symbols :</p> <p>X: The length of crack Z: The thickness of crack T: The thickness of glass</p> <p>Y: The width of crack. W: terminal length a : LCD side length</p> <hr/> <p>8.1 General glass chip: 8.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="539 1615 1353 1906"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>Crack can't enter viewing area</td> <td>$\leq 1/2 t$</td> </tr> <tr> <td>$\leq a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table> | X | Y | Z | $\leq a$ | Crack can't enter viewing area | $\leq 1/2 t$ | $\leq a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$ | Minor |
| X | Y | Z | | | | | | | | | | |
| $\leq a$ | Crack can't enter viewing area | $\leq 1/2 t$ | | | | | | | | | | |
| $\leq a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$ | | | | | | | | | | |

◆ Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

| NO | Item | Criterion | Level | | | | | | | | | | |
|---|--|---|--------------|---|--------------|--------------|--------------------------------|----------------|--------------|--|----------------------|--------------|-------|
| 08 | The crack of glass | <p>Symbols :</p> <p>X: The length of crack Z: The thickness of crack t: The thickness of glass</p> <p>Y: The width of crack. W: terminal length a: LCD side length</p> <hr/> <p>8.1.2 Corner crack:</p>  <table border="1" data-bbox="520 797 1337 1093"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't enter viewing area</td> <td>$Z \leq 1/2 t$</td> </tr> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table> | X | Y | Z | $\leq 1/5 a$ | Crack can't enter viewing area | $Z \leq 1/2 t$ | $\leq 1/5 a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$ | | |
| | | X | Y | Z | | | | | | | | | |
| $\leq 1/5 a$ | Crack can't enter viewing area | $Z \leq 1/2 t$ | | | | | | | | | | | |
| $\leq 1/5 a$ | Crack can't exceed the half of SP width. | $1/2 t < Z \leq 2 t$ | | | | | | | | | | | |
| <p>8.2 Protrusion over terminal:</p> <p>8.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="560 1729 1347 1904"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td>$\leq a$</td> <td>$\leq 1/2 W$</td> <td>$\leq t$</td> </tr> <tr> <td>Back</td> <td>$\leq a$</td> <td>$\leq W$</td> <td>$\leq 1/2 t$</td> </tr> </tbody> </table> | | X | Y | Z | Front | $\leq a$ | $\leq 1/2 W$ | $\leq t$ | Back | $\leq a$ | $\leq W$ | $\leq 1/2 t$ | Minor |
| | X | Y | Z | | | | | | | | | | |
| Front | $\leq a$ | $\leq 1/2 W$ | $\leq t$ | | | | | | | | | | |
| Back | $\leq a$ | $\leq W$ | $\leq 1/2 t$ | | | | | | | | | | |

◆ Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

| NO | Item | Criterion | Level | | | | | | | | | | | | |
|--------------|--------------------|--|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|--------------|----------|-------|
| 08 | The crack of glass | <p>Symbols:</p> <p>X: The length of crack Y: The width of crack. Z: The thickness of crack W: terminal length t: The thickness of glass a: LCD side length</p> <hr/> <p>8.2.2 Non-conductive portion:</p>  <table border="1" data-bbox="625 996 1257 1124"> <thead> <tr> <th><u>X</u></th> <th><u>Y</u></th> <th><u>Z</u></th> </tr> </thead> <tbody> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</td> </tr> </tbody> </table> <p>If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> <p>8.2.3 Glass remain:</p>  <table border="1" data-bbox="545 1624 1241 1751"> <thead> <tr> <th><u>X</u></th> <th><u>Y</u></th> <th><u>Z</u></th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </tbody> </table> <p>8.2.4 Cracking:</p>  <p>Not Allowed</p> | <u>X</u> | <u>Y</u> | <u>Z</u> | $\leq 1/3 a$ | $\leq W$ | $\leq t$ | <u>X</u> | <u>Y</u> | <u>Z</u> | $\leq a$ | $\leq 1/3 W$ | $\leq t$ | Minor |
| <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | | | | | | |
| $\leq 1/3 a$ | $\leq W$ | $\leq t$ | | | | | | | | | | | | | |
| <u>X</u> | <u>Y</u> | <u>Z</u> | | | | | | | | | | | | | |
| $\leq a$ | $\leq 1/3 W$ | $\leq t$ | | | | | | | | | | | | | |

◆ Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

| <u>NO</u> | <u>Item</u> | <u>Criterion</u> | <u>Level</u> |
|-----------|--------------------|---|--------------|
| 09 | Backlight elements | 9.1 Backlight can't work normally. | Major |
| | | 9.2 Backlight doesn't light or color is wrong. | Major |
| | | 9.3 Illumination source flickers when lit. | Major |
| 10 | General appearance | 10.1 Pin type, quantity, dimension must match type in structure diagram. | Major |
| | | 10.2 No short circuits in components on PCB or FPC. | Major |
| | | 10.3 Parts on PCB or FPC must be: no wrong parts, missing parts or excess parts. | Major |
| | | 10.4 Product packaging must the same as specified on packaging specification sheet. | Minor |
| | | 10.5 The folding and peeled off in polarizer are not acceptable. | Minor |
| | | 10.6 The PCB or FPC between B/L assembled distance(PCB or FPC) is ≤ 1.5 mm. | Minor |

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

- 5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

5.2 HANDLING

- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 5.2.7 Do not use ketonic solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is $320 \pm 10^{\circ}\text{C}$ and 3 ~ 5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM.
- 5.2.10 Caution! (LCM products with Capacitive Touch Panel)
Strong EMI-sources such as switch-mode power supplies (SPS) can lead to touch malfunction (e.g., ghost-touches). Therefore, the touch needs to be thoroughly tested inside the target application.
- 5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.
- 5.2.12 Double-sided tape designed to be attached with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-side tape for the attachment operation.

5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush, shake, or jolt the module.

5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.

| | | | | | |
|---------------|----------------------|--------------------------|---------|-------|---------|
| Ver.001 | | | Approve | Check | Contact |
| Documents NO. | PKG-PH800480T037-ZAA | Packaging Specifications | Rex | Rex | Stone |

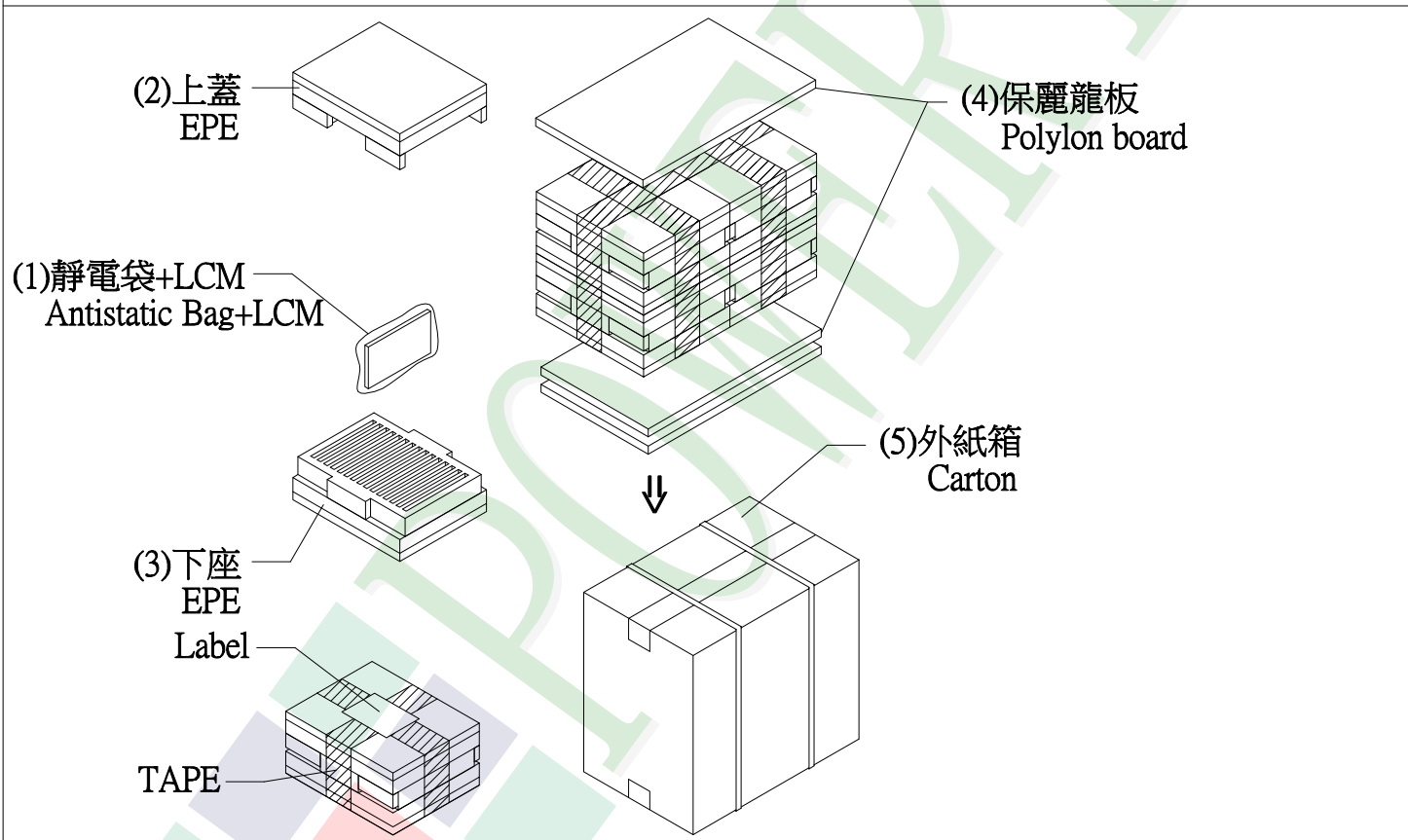
1. Packaging Material : (per carton)

| No. | Item | Model | Dimensions (mm) | 1Pcs Weight | Quantity | Total Weight |
|-----|----------------------|------------------|---------------------|-------------|----------|--------------|
| 1 | 成品 (LCM) | PH800480T037-ZAA | 164.9 X 100.0 X 3.4 | 0.106 | 60 | 6.36 |
| 2 | 靜電袋(1)Antistatic Bag | BAG240170ARABA | 240 X 170 | 0.0048 | 60 | 0.288 |
| 3 | 上蓋(2)EPE | FOAM000000078 | 310 X 250 X 90 | 0.1 | 4 | 0.4 |
| 4 | 下座(3)EPE | FOAM000000079 | 310 X 250 X 100 | 0.17 | 4 | 0.68 |
| 5 | 保麗龍板(4)Polylon board | OTPLB00000017 | 510 X 310 X 15 | 0.025 | 3 | 0.075 |
| 6 | 外紙箱(5)Carton | BX52732536CDBA | 527 X 325 X 360 | 1.092 | 1 | 1.092 |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |

2. 一整箱總重量 (Total LCD Weight in carton) : 8.9 Kg±10%

3. 單箱數量規格表 (Packaging Specifications and Quantity) :

(1) Total LCD quantity in carton : quantity per box 15 x no of boxes 4 = 60



特記事項 (REMARK)

| | |
|---|--|
| 4. 包裝數量不足時需以EPE(舒美墊)填補空槽 EPE:OTFOAMEP0003BA自裁成 (166.5X109.0X10mm) | |
|---|--|